

APPENDIX C

AIRLIFT PLANNING FACTORS

Air transport resources are seldom sufficient to satisfy all demands, especially in large operations. In planning for airlift, commanders must use the fewest aircraft needed to complete the task in the required time; they decide on the use of airborne combat forces in light of continuous planning at the highest joint headquarters in the field. The allocation of air transport resources to supported services requires detailed staffing. To reduce the time required for staffing, planning staffs must have the following data available:

- The number of aircraft and crews available, by type.
- Ž The payload that the aircraft can carry for the distance that the operation demands.
- The number and weights of soldiers, weapons, vehicles, equipment, and supplies in each unit involved.
- The routine maintenance requirements of the deployed force.
- The availability of materiel-handling equipment.
- Any operational limitations such as the maximum number of aircraft allowed on the ground at any one time (MOG).
- Intelligence on the enemy situation.

Section I. AIRLIFT ESTIMATES

Planning factors presented in this appendix should be used to make rough estimates of airlift capability. Due to the many variables involved in every airlift operation, these factors do not universally apply. Instead, they provide “order of magnitude” estimates. The use of detailed computer simulation models is encouraged for extensive calculations.

C-1. AIRLIFT CATEGORIES

The following paragraphs provide broad airlift planning factors for peacetime and wartime operations. Six airlift mission categories are described, although many airlift aircraft can perform in more than one mission category.

a. **Strategic Airlift.** Aircraft in this category provide continuous air movement from CONUS to or between different overseas areas.

- b. **Theater Airlift.** These aircraft provide air movement of personnel, supplies, and equipment on a sustained, selective, or emergency basis to dispersed sites within a theater of operations.
- c. **Civil Reserve Air Fleet.** Aircraft in this airlift category provide airlift services during emergencies and contingencies through contractual arrangements with selected US airlines.
- d. **Tanker And Cargo Airlift.** Aircraft in this category provide about 8 percent of the wartime cargo airlift capability.
- e. **Aeromedical Airlift.** These aircraft move theater casualties to rear area medical facilities during combat. They support the DOD regional health care system in peacetime.
- f. **Operational Support Airlift.** Aircraft in this category support the following Air Force requirements:
 - Command and staff movements.
 - Aircrew repositioning.
 - Medical team moves.
 - Intelligence.

C-2. PALLET INFORMATION

The standard 463L pallet is 108 inches wide by 88 inches long, weighs 355 pounds with the restraining nets, and uses 2.25 inches of available aircraft height. Unless otherwise noted, a 463L pallet is a Type I as defined by MIL-P-27443 (USAF). After deductions for tie-down equipment, the remaining usable area on the pallet is 104 inches by 84 inches. When one of these pallets is loaded to 8 feet (the height allowance for pallet loads), the space used equals 485 cubic feet. The pallet permits maximum loads, including wheel loads of 250 psi.

C-3. MAXIMUM PAYLOADS

The size, shape, and density of most payloads rarely permit loading to 100 percent of the maximum payload capacity. Maximum payload data should not be used for planning. Using average payload data results in more accurate sorties predictions.

C-4. AVERAGE PAYLOADS

To determine the average payload for bulk cargo, multiply the number of pallets by the average weight of a pallet. Average bulk payloads are calculated using 2.3 short tons for each pallet position, including the weight of the pallet. Oversize and outsize payloads are based on actual loading exercises or output from the load-generator model.

C-5. AIRCRAFT DIMENSIONAL RESTRICTIONS

The following factors are used in determining the longest single item dimensional restrictions.

- a. The loading entrance cross-section dimensions usually govern the size of the LSI. (Table C-1.) However, many other factors (such as vehicle ground

clearance, ramp incline approach angle, cargo compartment geometry, the three dimensional conditions of the cargo, and floor-loading restrictions) must be considered before conclusive LSI guidance can be provided.

WARNING

WHEN CARGO CLEARANCE IS WITHIN 6 INCHES OF THE DIMENSIONAL FACTORS GIVEN IN TABLE C-1, DAMAGE TO THE AIRCRAFT COULD OCCUR DURING LOADING.

TYPE AIRCRAFT	CARGO DOOR	HEIGHT
C-5	Front	162
	Rear	150
C-141	Loading	109
	Airdrop	100
C-130	Loading	108
	Airdrop	100
C-23		75
KC-10/DC-10		102
B-747	Side	120-123
	Nose	77-98
B-707		91
DC-8		85

Table C-1. Aircraft cargo door dimensions.

- b. Regulations require an aisle of about 14 inches on C-130 aircraft because they do not have catwalks in the cargo compartments. Aircrews use this aisle to inspect loads and systems while in flight.

C-6. FUEL REQUIREMENTS AND CONSUMPTION

When planning an airlift mission, fuel requirements must be considered. Aircraft range and payload are greatly affected by a mission's fuel requirements. As the distance increases, the fuel requirements increase and the allowable load decreases. Payloads shown in various figures of this manual already consider fuel needs. However, these figures usually assume fuel is available at the offload location. Each aircraft requires a specific fuel type and has a unique fuel consumption rate. (Table C-2.) Before using the payload figures in this manual, the planner should ensure that adequate stocks of the correct fuel exist for refueling the aircraft. If refueling is not possible at the offload station, potential payloads could be reduced, or additional en route stops could be required. The payloads generated by figures in this manual are based on zero wind fuel requirements and are suitable for general planning. Actual mission payloads would have to be adjusted to allow for wind factors at the time of the operation.

	C-5A/B	C-130	C-141	C-17A
Fuel Grade	JP4	JP4	JP4	JP4
Type Oil	Syn Jet	Syn Jet	Syn Jet	Syn Jet
Fuel Flow (Lbs/Hr)	20,000	5,000	12,000	N/A

Table C-2. Fuel types and consumption rates.

NOTE: Performance can be affected if alternate grades of fuel are used.

C-7. AIR REFUELING

The mission planner should never consider more than two air refuelings unless unusual circumstances exist. When considering air refueling, the deployment distance divided by three equals the critical leg.

C-8. SPECIAL AIRLIFT DELIVERY MODES

The many variables in determining theater airlift capability make it impractical to show comprehensive planning factors in a tabular form. To correctly estimate the airlift capability for specific missions, headquarters MAC/DOOM can be consulted. Theater airlift missions are developed to support specific exercises and contingency operations in contrast to intertheater airlift missions, which operate over established routes.

C-9. AIRFIELD RESTRICTIONS

Each aircraft has specific requirements and restrictions to ensure efficient operations into diverse airfields worldwide. Airfield size, MOG, weather, ATC, and navigational facilities all influence the selection of alternate airfields. Due to the number of variables involved in determining minimum runway requirements and maximum payloads, an operational decision is made on a case-by-case basis. Headquarters MAC/DOVF, Scott AFB IL 62225-5001, can be contacted to obtain the most current data on suitable worldwide airlift airfields.

C-10. MATERIELS-HANDLING EQUIPMENT

The MHE is a family of forklifts, cargo transport loaders, wide-body loaders, container lift trucks, and associated smaller equipment designed to interface with the rollerized cargo movement systems in air terminals and on military aircraft. They are designed to move palletized cargo on standard 88- by 108-inch pallets between the air terminal and cargo aircraft in support of airlift operations. Materiel-handling equipment is always required at the departure airfield and at the arrival airfield once airland operations begin.

C-11. MISSION SUPPORT REQUIREMENTS

For many airlift missions, MAC support equipment and personnel are necessary to ensure the success of the airlift flow. Depending on the size and specific circumstances of the mission, support can range from small requirements routed through common MAC bases to large requirements routed mainly through undeveloped airfields. These airfields have no capability to receive or process a major airlift flow. While specific planning factors provide a wide range of possibilities, it is important to recognize the likelihood that mission support requirements will increase as the movement requirements increase.

C-12. AEROMEDICAL EVACUATION CAPABILITY

Aeromedical evacuation capability varies significantly by aircraft type. (Table C-3.) The C-141B is the primary strategic aeromedical evacuation aircraft. Although other aircraft can be used on an opportune basis to move patients, the C-130 and C-9A are the primary aircrafts for theater aeromedical evacuation missions.

- a. Assigned aeromedical airlift unit equipment is used to determine the amount of retrograde airlift for aeromedical evacuation (retrograde airlift is airlift returning from the area of hostilities).
- b. The number of aeromedical evacuation medical crew members required for strategic evacuation operations is computed on the basis of 50 mission hours a month and a crew planning factor of 1:25. (one crew member is planned for each 10 patients. For example, a standard crew complement to support the C-141 planning factor of 65 patients would be three flight nurses and four medical technicians.)
- c. The number of aeromedical evacuation medical crew members required for tactical evacuation operations is computed on the basis of 60 mission hours a month and a crew ratio of 1:25. (A standard crew to support C-130 operations would be two flight nurses and three medical technicians.)
- d. Airlift requirements for aeromedical evacuation are determined by dividing the number of patients by the patient load factor. (Table C-3.)

C-13. PLANNING FACTORS

Airlift planning factors can be used as source data in a computer simulation model. They can also be used to estimate how long it would take a given airlift fleet to deliver (close) a force to a specific location. Section II of this appendix gives detailed information on each airlift aircraft.

C-14. ESTIMATION OF PAYLOAD DATA

The average payload of an airlift is a basic factor in converting airlift tonnage requirements into numbers of airlift sorties,

- a. Determine the route segment distance.
- b. Determine the average payload for each mission. (Table C-4, see page C-7.)

c. Determine the number of missions required using this formula:

$$\frac{\text{Number of Missions}}{\text{Required}} = \frac{\text{Move Requirement (tons)}}{\text{Average Payload (tons/mission)}}$$

NOTE: Any fraction of a mission is always rounded up.

	C-9A	C-130 All Models	C-141B W/Comf Pallet	C-141B W/O Comf Pallet
Medical Crew				
Flight Nurse	2	2	3	3
Med Tech	3	3	4	4
Peacetime				
Total ¹				
Litter/Walking	9/30	24/36 ²	31/78	31/78 ⁶
Wartime/ Emergency				
All Litter	40	74 ²	103	103
All Walking	40	36/82 ²	140 ⁴ /165 ⁵	161 ⁴ /195 ^{2,5}
Surge				
Litter/Walking	40/0 ¹	30/42 ^{1,2}	32/79	32/79
Floor Loading		20	36	40
Load Planning				
Factors	40	50	65	65

¹ Various litter and walking combinations are available at all times.

² Side-facing seats are used.

³ If a full medical crew is on board, only 70 positions are available.

⁴ Aft-facing seats are used.

⁵ Due to life raft limitations, the number of walking patients may be reduced to 160 on overwater flights.

⁶ Peacetime strategic missions normally use a comfort pallet.

Table C-3. Aeromedical airlift capabilities.

C-15. COMPUTATION OF CYCLE TIME

The cycle time of an airlift aircraft can be used to determine the number of tons a single aircraft can deliver a day. Cycle time can be affected by choke points in the airlift system such as diplomatic considerations, airfield availability, weather, and en route support.

a. Determine the block speed for each route segment at peacetime cruise speeds. Average block speed can be calculated using this formula:

$$\text{Average Block Speed} = \frac{\text{Round Trip Distance}}{\text{RTFT}}$$

b. Determine the RTFT using this formula:

$$\text{RTFT} = \frac{(\text{Leg 1 distance}) \times 2}{\text{Leg 1 block speed}} + \frac{(\text{Leg 2 distance}) \times 2}{\text{Leg 2 block speed}}$$

c. Determine the TGT using this formula: (Table C-5.)

$$\text{TGT} = \text{Onload Time} + \text{En Route Time} + \text{Offload Time}$$

d. Determine the cycle time using this formula:

$$\text{Cycle Time} = \text{RTFT} + \text{TGT}$$

TYPE AIRCRAFT	DISTANCE (NM)	AVERAGE PAYLOAD (TONS)			MAXIMUM PAYLOAD	PAX CAPABILITY
		BULK	OVERSIZE	OUTSIZE		
C-5	2,000	82.8	74.5	101.0	112.7	73
	2,500	82.8	71.9	82.8	99.9	73
	3,000	82.8	69.1	77.7	87.3	73
	3,500	75.7	65.1	66.5	75.7	73
C-130E (H)	Peacetime					
		500	13.8	12.6	22.0 (22.1)	8
		1,000	13.8	12.5	20.5 (20.6)	8
		1,500	13.8	12.1 (12.4)	19.3 (19.5)	8
		2,000	13.8	11.3 (11.4)	15.7 (16.2)	8
		2,500	12.2 (12.8)	10.1 (10.5)	12.2 (12.8)	8
		3,000	8.9 (9.9)	8.0 (8.7)	8.9 (9.9)	8
	Wartime	3,500	2.7 (5.5)	2.6 (4.8)	2.7 (5.5)	8
		500	13.8	12.7	24.8	8
		1,000	13.8	12.7	23.3	8
		1,500	13.8	12.6	22.2 (22.3)	8
		2,000	13.8	12.5	20.7 (20.8)	8
C-141	Peacetime					
		2,000	29.9	26.0	34.4	22
		2,500	29.9	25.2	29.9	22
		3,000	25.9	23.9	25.9	22
		3,500	20.3	19.6	20.3	22
	Wartime					
		2,000	29.9	26.5	44.26	
		2,500	29.9	26.5	36.26	
		3,000	29.9	26.4	33.3	26
		3,500	26.6	24.5	26.6	26

Table C-4. General airlift planning factors.

	C-5A/B	C-130	C-141
Onload Time	3 + 45	1 + 30	2 + 15
En Route Time	2 + 15	1 + 30	2 + 15
Offload Time	3 + 15	1 + 30	2 + 15

NOTE: All times are in hours and minutes.

Table C-5. Average ground times for contingency and exercise planning.

C-16. DETERMINATION OF CLOSURE

Closure is defined as the total elapsed time from takeoff of the first airlift mission at the onload base until the last airlift mission lands at the destination base. The following process provides a closure estimate for moving an airborne division from Tinker AFB to Cairo. Wartime planning factors apply. The aircraft allocation is 20 C-5s and 50 C-141s. This example only covers the cargo requirement; however, the passenger movement could be handled in a similar manner.

a. Determine the Movement Requirements. The Army estimates the Airborne Division, pre-positioned at Tinker AFB, has these characteristics:

Outsize <u>Tons</u>	Oversize <u>Tons</u>	Bulk <u>Tons</u>	Total <u>Tons</u>
500	14,000	500	15,000

Since the movement requirement contains outsize cargo, an outsize capable aircraft must be included in the airlift allocation.

b. Determine the Aircraft Routing. Many common MAC route segment distances are available; however, if a specific route segment is not listed, the planner must use appropriate flight planning documents or compute great circle distances. These figures are available:

<u>Route Segment</u>	<u>Distance (NM)</u>
Tinker - McGuire	1,138
McGuire - Lajes	2,234
Lajes - Cairo	3,154

c. Determine the Average Payload for Each Aircraft Type. The longest route segment is used to determine the average payload; however, operations into a field with a short runway could severely limit the payload. Since over 90 percent of the movement requirement consists of oversize cargo, the

“oversize” column should be used to determine average payloads. (Table C-4.)
The 3,500 NM row yields:

$$\text{C-5 average payload} = 65.1 \text{ tons}$$

$$\text{C-141 average payload} = 19.6 \text{ tons}$$

d. Determine the Cycle Time for Each Aircraft Type. To determine the cycle time for each aircraft type, the following formulas are used.

(1) Determine block speeds for each aircraft.

<u>Leg Distance</u>	<u>C-5 Block Speed</u>	<u>C-141 Block Speed</u>
1,138	389	370
2,234	415	394
3,154	427	405

(2) Determine the RTFT for each aircraft type using this formula:

$$\text{RTFT} = \frac{\text{distance leg 1 x 2}}{\text{block speed leg 1}} + \frac{\text{distance leg 2 x 2}}{\text{block speed leg 2}} + \frac{\text{distance leg 3 x 2}}{\text{block speed leg 3}}$$

$$\text{RTFT C-5} = \frac{1,138 \times 2}{389} + \frac{2,234 \times 2}{415} + \frac{3,154 \times 2}{427}$$

$$\text{RTFT C-5} = 5.8 + 10.7 + 14.7 = 31.2 \text{ hours.}$$

$$\text{RTFT C-141} = \frac{1,138 \times 2}{370} + \frac{2,234 \times 2}{394} + \frac{3,154 \times 2}{405}$$

$$\text{RTFT C-141} = 6.0 + 11.0 + 15.2 = 32.2 \text{ hours.}$$

(3) Determine the TGT for each aircraft type using this formula (Table C-5):

$$\begin{aligned} \text{TGT} = & \text{ Onload Time (Tinker)} + \text{En route Time (McGuire)} + \\ & \text{En route Time (Lajes)} + \text{Offload Time (Cairo)} + \\ & \text{En route Time (Lajes)} \end{aligned}$$

$$\text{TGT (C-5)} = (2 + 15) + (2 + 15) + (3 + 15) + (3 + 45)$$

$$\text{TGT (C-5)} = 13 + 45 = 13.75 \text{ hours}$$

$$\text{TGT (C-141)} = (2 + 15) + (2 + 15) + (2 + 15) + (2 + 15) + (2 + 15)$$

$$\text{TGT (C-141)} = 11 + 15 = 11.25 \text{ hours}$$

(4) Determine the cycle time for each aircraft type using this formula:

$$\text{Cycle Time} = \text{RTFT} + \text{TGT}$$

$$\text{Cycle Time (C-5)} = 31.2 + 13.75 = 44.95 \text{ hours}$$

$$\text{Cycle Time (C-141)} = 32.2 + 11.25 = 43.45 \text{ hours}$$

(5) Determine the tons a day, an aircraft type (T/D/AC) using this formula:

$$T/D/AC = \frac{(Average\ Payload)\ (24)\ (Number\ of\ Aircraft)}{Cycle\ Time}$$

$$T/D/AC\ (C-5) = \frac{(65.1)\ (24)\ (20)}{44.95} = 716.5\ tons$$

$$T/D/AC\ (C-141) = \frac{(19.6)\ (24)\ (50)}{43.45} = 654.5\ tons$$

(6) Determine the total tons delivered a day (TT/D) for the fleet using this formula:

$$TT/D = T/D/AC\ (C-5) + T/D/AC\ (C-141)$$

$$TT/D = 716.5 + 654.5 = 1,371.0\ tons/day$$

(7) Determine the closure using this formula:

$$Closure = \frac{Movement\ Requirement}{TT/D}$$

$$Closure = \frac{15,000\ tons}{1,371\ tons/day} = 10.9\ days$$

e. **Determine Revised Cycle Time.** This example explains one situation when the cycle time might have to be revised. It involves a large-scale operation where most of the fleet of an aircraft type are scheduled to be used. In this case, the cycle time might have to be adjusted to maintain an objective use rate. The UTE rate is not a limiting factor unless most of the fleet is involved. The example operation involves 210 C-141 aircraft (nearly all of the C-141s) with a cycle time of 32 hours and an RTFT of 22 hours. The fleet must not exceed a UTE rate of 10 hours a day. The planned UTE rate is computed using the following formula:

$$UTE\ (planned) = \frac{RTFT\ x\ 24}{cycle\ time} = \frac{22\ x\ 24}{32} = 16.5\ hours\ per\ day$$

Since the planned UTE rate of 16.5 hours per day exceeds the objective UTE rate of 10 hours per day, a revised cycle time must be computed using this formula:

$$\text{Cycle Time} \quad \frac{RTFT\ x\ 24}{Objective\ UTE} = \frac{22\ x\ 24}{10} = 52.8\ hours \\ (\text{adjusted})$$

The adjusted cycle time should now be used to compute closure.

C-17. PRODUCTIVITY FACTORS

Productivity factors (percentages) are gross measures of an aircraft's ability to move cargo and passengers to a user.

- a. On a strategic airlift mission involving an outbound and a return leg, the outbound leg is productive and the return leg is nonproductive. Therefore, the productive factor would be 50 percent. It is assumed that the cargo has already been positioned at the aircraft's departure point. Usually, airlift aircraft must fly one or more positioning legs to an on-load location. Since productive cargo is usually not moved at this time, positioning legs reduce the overall productivity factor to a value less than 50 percent. For example, an aircraft is flying from Charleston AFB to an aerial port of embarkation at Pope AFB (positioning leg). Then to an aerial port of debarkation at Torrejon AB (outbound leg) and back to Charleston AFB (return leg). Although the entire round-trip distance is 7,550 miles, only 3,550 miles (the distance from Pope to Torrejon) is considered productive. Therefore, the productivity factor is 47 percent ($3,500 / 7,550$).
- b. A similar example for theater airlift is not as straightforward. Within a theater, productive cargo is moved on both inbound and outbound legs. However, the overall productivity factor for theater airlift aircraft is lower, because the positioning and repositioning legs compose a greater part of the total distance.
- c. Both the strategic and theater productivity factor calculations are situation specific. To provide productivity factors with broad planning applications, the following average productivity factors are compiled:

Strategic Airlift - 47 percent.

Tactical Airlift - 40 percent.

In this context, strategic airlift refers to any aircraft that is performing an intertheater mission. Theater airlift refers to any aircraft that is operating solely within a theater.

Section II. SPECIFIC AIRCRAFT DATA

This section provides statistical data and comparisons of the characteristics of the major USAF airlift aircraft. (Figure C-1, see page C-16.)

C-18. C-130E/H DATA

a. Description.

General	Lockheed, 4 turboprop engines.
Wing span	132 feet, 7 inches,
Overall length.....	99 feet, 6 inches.
Main gear track	14 feet, 3 inches.
Usable fuel.....	60,112 pounds.
Mission	Cargo, soldiers, tactical airdrop, and airland.

b. Loading Characteristics.

Rear ramp, ground, or truck bed level, and 463L system.

c. Main Cabin Dimensions.

Length (maximum usable)	470 inches.
Width (maximum usable)	114 inches, 105 inches.
Height (maximum usable)	108 inches.
Usable floor area (fixed and ramp)	370 square feet.
Usable cube (main compartment)	2,818 cubic feet.

d. Door Dimensions.

Width.....	123 inches.
Height.....	108 inches.

e. Performance. (H-model characteristics that are different are shown in parentheses.)

Maximum ferry range	3,685 nautical miles. (3,962 nautical miles).
Average cruise speed	280 knots (300 knots).
Takeoff gross weight (emergency or wartime) . . .	173,700 pounds.
Takeoff gross weight (peacetime) . . .	153,700 pounds.
Normal operating altitude	18,000 feet/26,000 feet. (23,500 feet/28,000 feet).

Minimum runway requirements:

Takeoff.....	2,600 feet (2,300 feet).
Landing.....	2,700 feet (2,360 feet).
Maximum ACL (floor loaded)	35,000 pounds (35,500 pounds).

Maximum number of 463L pallets6.

Maximum number of soldiers:

Wartime	91.
Peacetime	74.
Maximum number of paratroopers	64.
Minimum pavement for JN-degree turn	74 feet.
Minimum runway width	60 feet.

C-19. C-141B DATA**a. Description.**

General	Lockheed, 4 turbojet engines.
Wing span	160 feet.
Overall length	168 feet, 4 inches.
Main gear track	21 feet, 7 inches.
Usable fuel	153,352 pounds.
Mission	Cargo, soldiers, tactical airdrop.

b. Loading Characteristics.

Rear ramp, ground, or truck bed level, and 463L system.

c. Main Cabin Dimensions.

Length	1,120 inches.
Width	123 inches.
Height	109 inches.
Usable floor area (fixed and ramp)	937 square feet.
Usable cube (main compartment)	7,024 cubic feet.

d. Main Door Dimensions.

Width	123 inches.
Heighth	109 inches.

e. Performance.

Maximum ferry range	4,531 nautical miles.
Average cruise speed	425 knots.
Takeoff gross weight (emergency or wartime)	343,000 pounds.
Takeoff gross weight (peacetime)	323,000 pounds.
Normal operating altitude	FL 310-410.
Minimum runway requirements:	
Takeoff (wartime weight)	8,420 feet.
Takeoff (peacetime weight)	7,350 feet.
Landing (brakes only)	3,840 feet.
Maximum ACL (floor loaded)	89,000 pounds.
Maximum numbers of 463L pallets	13.
Maximum number of soldiers:	
Wartime	200 (Flying overland). 153 (Flying over water).
Peacetime	143.
Maximum number of paratroopers	155.
Minimum pavement for 180-degree turn	137 feet.
Minimum runway width	98 feet.

C-20. C-17A DATA**a. Description.**

General	McDonnell Douglas, 4 turbofan engines.
Wing span	165 feet.
Overall length	175.2 feet.
Mission	Long-range, heavy-lift cargo transport.

b. Cabin Capacity.

Length	88 feet.
Width	18 feet.
Height	12.3 feet.
Floor area	1,584 square feet.
Usable cube	20,900 cubic feet.

c. Main Door Dimensions.

Width	18 feet.
Length	19 feet, 8 inches.

d. Performance.

Maximum ferry range	4,700 nautical miles.
Average cruise speed	460 knots.
Takeoff gross weight.....	580,000 pounds.
Normal operating altitude	FL 30 to FL 41.
Minimum runway requirements:	
Takeoff.....	7,600 feet with 167,000-pound payload.
Landing (thrust reversal)	3,000 feet with 167,000-pound payload.
Maximum ACL	172,200 pounds.
Maximum number of 463L pallets	18.
Maximum number of paratroopers	102.
Minimum pavement for 180-degree turn	90 feet.
Minimum runway width	90 feet.

C-21. C-5A/B DATA**a. Description.**

General	Lockheed, 4 turbojet engines.
Wing span	222 feet, 8 inches.
Overall length	247 feet, 10 inches.
Main gear track (outside)	37 feet, 6 inches.
Fuel capacity	332,500 pounds.
Mission	Airlift cargo and soldiers.

b. Loading Characteristics.

Front and aft ramp, ground, or truck bed level, and 463L system.

c. Cabin Capacity.

Length	121 feet, 1 inch.
Width	19 feet, 0 inches.
Height	13 feet, 6 inches.
Usable floor area (fixed and ramp)	2,747 square feet.
Usable cube-main compartment (floor loaded)	18,368 cubic feet.

d. Door Dimensions.

Front 228 inches wide,
 162 inches high.

Rear:

Drive in (ramp down) forward or level kneel	228 inches wide, 161 inches high.
Drive in (ramp down) aft kneel	228 inches wide, 153 inches high.
Truck loading (ramp level)	228 inches wide, 114 inches high.

e. Performance.

Maximum ferry range	6,238 nautical miles.
Takeoff to block-in speed	436 knots.
Average cruise speed	436 knots.
Maximum takeoff gross weight	769,000 pounds.
Normal operating altitudes.....	FL310-410.
Minimum runway requirements:	
Takeoff.....	9,150 feet.
Landing	4,610 feet.
Maximum payload (floor loaded)	291,000 pounds
Maximum number of 463L pallets	36.
Maximum number of soldiers	340 (Airbus configuration; normally 73 soldiers will ride in upstairs troop compartment.)
Minimum pavement for 180-degreee turn	150 feet.
Minimum runway width	150 feet.

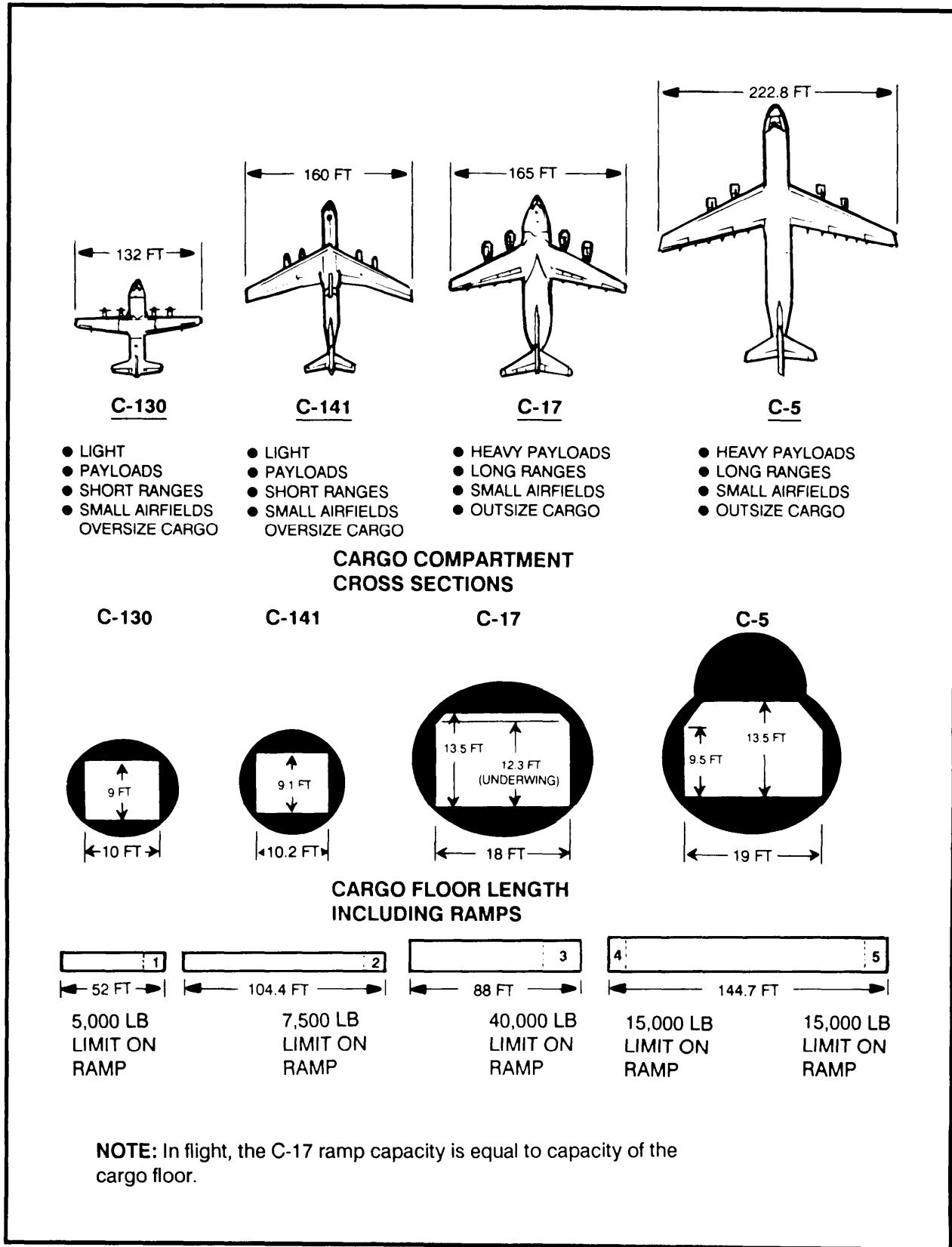


Figure C-1. USAF C-17A comparison.